## Depressive symptoms and health problems among Chinese immigrant elders in the US and Chinese elders in China

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# Abstract

**Objectives:** Researchers speculate that depression tends to be more prevalent among immigrant elders due to their lack of resources, acculturation stress, language problems, and social isolation. However, other characteristics of elderly immigrants, such as the healthy immigrant effect, may counteract these potential risk factors. This study examined whether depressive symptoms differed between Chinese immigrant elders and their counterparts in China and whether health conditions were similarly associated with depressive symptoms in these two samples.

**Methods:** Depression and health information was collected from 177 Chinese immigrant elders in Boston, the US in 2000 and from 428 education and gender-matched elders in Shanghai, China in 2003.

**Results:** Chinese immigrants had a significantly lower score on the modified Center for Epidemiologic Studies Depression Scale (CES-D) and its subscales: somatic symptoms and depressive affect. The association remained for the subscale depressive affect in multivariate analyses. Arthritis and back or neck problems were associated with a higher level of depressive symptoms among Chinese immigrants, while problems in walking were associated with depression among their counterparts in China. Pain was an underlying contributor to the association between depression and these health problems in both the groups.

**Conclusions:** This study suggests that Chinese immigrant elders might be more resilient than their counterparts despite many challenges they face after moving abroad. With the growing number of older Chinese immigrants in the US, a better understanding of depressive symptoms is essential to provide culturally competent services to better serve this population.

**Keywords:** depression; cultural aspects; cross-national/international studies

# Introduction

Major depression affects about 4% of older adults in the US at any one time (Blazer & Williams, 1980), while another 10% have depressive symptoms that do not meet criteria for major depression (Hybels, Blazer, & Pieper, 2001). Parallel findings from China and Hong Kong show an overall

prevalence rate of 3.86% for major depression and 12.5-14.81% for depressive symptoms (Chen, Copeland, & Wei, 1999; Chi et al., 2005) among Chinese older adults. The limited information on depression among Chinese immigrants in the US has been inconsistent. One study (Kuo, 1984) reported that Chinese immigrants in the US had fewer depressive symptoms than white Americans. This study also found that foreign-born Chinese had significantly fewer depressive symptoms than Chinese-Americans born in the US (Kuo, 1984). In contrast, another study using the same depression measure reported that foreign-born Chinese had higher depressive symptom scores than Chinese-Americans born in the US (Ying, 1988). These studies were not limited to older adults, so the findings are not directly applicable to understanding depression among Chinese immigrants in later life.

Researchers speculate that numerous factors, such as lack of financial resources, acculturation stress, language problems, discrimination, and social isolation (Gelfand & Yee, 1991; Mui, 1998) may increase the risk of depression for immigrants. However, other characteristics of elderly immigrants may counteract these potential risk factors. For example, the healthy immigrant effect, that is, the propensity of immigrants to be much healthier than a representative person in both the sending and receiving countries has been documented in the US and Canada (Jesso, Massey, Rosenzweig, & Smith, 2004; McDonald & Kennedy, 2004). Compared to those who are native born in receiving countries, immigrants tend to be healthier in terms of longer life expectancies (Jesso et al., 2004), more years free of disability (Chen, Ng, & Wilkins, 1996), better perceived health (Frisbie, Cho, & Hummer, 2001; Gee, Kobayashi, & Prus, 2004), lower mortality given their socio-economic status (Franzini, Ribble, & Keddie, 2001), and fewer chronic diseases such as arthritis, hypertension and diabetes (Chen et al., 1996; McDonald & Kennedy, 2004; Perez, 2002). Compared to other immigrant populations in the US and Canada, the healthy immigrant effect is particularly strong for those from countries like China (Chen et al., 1996; Frisbie et al., 2001).

Immigration is a self-selection process in other ways also; immigrants are not a random sample of the population at their place of origin (Ghatak, Levine, & Price, 1996; Hatton & Williamson, 2003). Instead, they typically constitute a selected group in terms of age, education, marital status, or occupation (Chiswick, 2000; Liebig & Sousa-Poza, 2004). Further, social support and social capital have been shown to have a substantial positive impact on health and health outcomes. The extensive social networks and support that often characterize immigrant communities may be critical to the healthy immigrant effect (Flores & Brotanek, 2005). For several immigrant groups who have a long history of settlement in the US (e.g. Chinese and Japanese), the explanation for the relatively good health among immigrants may lie in the fact that some quality of life and health advantages may accrue among these groups during a long period of time in which positive social, economic, and political adaptations to a host society have been developed (Frisbie et al., 2001).

All of the above-noted factors are important because they have consistently been linked to risk of depression among older adults. Health problems have been associated with depression in both the US (Bair, Robinson, Katon, & Kroenke, 2003; Dunlop, Lyons, Manheim, Song, & Chang, 2004) and Chinese older adults (Chi et al., 2005; Wu, Tran, & Amjad, 2004; Zhang et al., 1997). Receiving more instrumental support is also associated with higher level of depressive symptoms (Wallsten, Tweed, Blazer, & George, 1999). In addition, numerous studies have documented that low socioeconomic status, such as few years of education (Miech & Shanahan, 2000) and limited financial resources (Luo & Waite, 2005; Stokes, Thompson, Murphy, & Gallagher-Thompson, 2001), are associated with increased risk of depression in older adults, while more social support (Chou & Chi, 2003; Matt & Dean, 1993; Oxman, Berkman, Kasl, Freeman, & Barrett, 1992) and healthy behavior, exercise in particular (Donaghy, 2007; Lawlor & Hopker, 2001; Strawbridge, Deleger, Roberts, & Kaplan, 2002) have been tied to lower rates of depression.

Most previous studies have focused on physical health (e.g., mortality and medical conditions) by comparing the health of immigrants to that of the native born in the receiving country. Research on the mental health of elderly immigrants has been limited and similar to the studies on physical health,

the previous work has primarily focused on comparisons of immigrants and native-born populations (Jesso et al., 2004), and on the entire adult age span (Ying, 1988).

We have previously reported on depressive symptoms in an elderly Chinese immigrant sample. Here we compare the rate of depressive symptoms in an elderly Chinese immigrant sample in Boston, USA and an elderly Chinese sample in Shanghai, China. To our knowledge, this is one of the first studies to compare depressive symptoms in a first-generation elderly immigrant population with their counterparts in the land of origin. Given the healthy immigrant effect and the preponderance of protective versus risk factors for depression in the immigrant population, we hypothesized that the Boston sample would have fewer depressive symptoms than the Shanghai sample but that the health problems as correlates to depression would be similar for these two samples.

# Methods

## Sample design

The study included two groups, Chinese immigrants in the Greater Boston area, USA and residents of Shanghai, China. The Chinese immigrants in urban and suburban areas of Boston were recruited in 2000 through the staff at several Chinese senior centers run by a Chinese services agency and a Chinese senior housing development. Due to the eligibility requirements for senior housing, individuals recruited from this source were likely to be of lower socioeconomic status than recruits from the senior centers. The individuals recruited from senior centers likely had a broader range of income levels. Participants were given a cover letter stating the purpose of the study, the self-administered questionnaire, a consent form, and return envelopes. The questionnaire and consent form were returned in separate sealed envelopes to the staff at the agencies who then presented the respondents with a grocery gift card. Questionnaires were given to 200 immigrant Chinese elders 60 years and older and returned by 177 for a response rate of 88.5%. All participants were first generation immigrants and most (69%) immigrated to the US after age 50.

The questionnaire was translated from English to Mandarin Chinese by the first author (B. Wu), who is a bilingual and bicultural gerontologist. To assure cultural equivalence, the translation was also reviewed and evaluated by two bilingual social workers who worked with Chinese elders in the Boston Chinese community. For a detailed description of instrumentation see Wu et al. (2004).

The study participants in Shanghai, China were recruited in 2003 using a three-stage sampling method. The first step was to select two districts in Shanghai, and the second step was to select two street committees from each of these two districts. The third step was to select two neighborhood committees from each street, resulting in a total of eight neighborhood committees selected. Each neighborhood is overseen by an administrative committee that maintains a housing registry, which contains basic demographic characteristics for each resident in each household in the neighborhood. Based on input from our collaborators in China, we selected these eight communities to reflect a range of levels of socioeconomic status in Shanghai. With the collaboration of the administrative committees, B. Wu selected study subjects randomly from the housing registration based on their gender and educational level. In order to ensure some comparability between the two samples, the Shanghai sample was selected to have similar levels of education and similar gender distribution as the Boston sample. Research assistants in Shanghai conducted in-person interviews in Mandarin after obtaining written consent. A total of 428 subjects (91% response rate) aged 60 years and older completed an in-person interview. The major reason for non-participation was that the individual was unavailable during the data collection period. No significant differences in age and education were found between participants and non-participants.

We used in-person interviews because previous research has shown that this approach is the most common and accepted survey method for older adults in China (Wu et al., 2005). B. Wu modified the questionnaire used in Boston to exclude terms that are only applicable in the US, such as HMO, Medicare, Medicaid, Supplemental Security Income, public housing, and Food Stamps. The Shanghai questionnaire contained equivalent words used in China, such as social medical insurance and government subsidies. The translated version was reviewed and evaluated by Chinese faculty at the Shanghai University Sociology Department and sociology students, who were the interviewers.

All procedures were approved by the West Virginia University Institutional Review Board.

## Measures

The questionnaire included information on demographics, depression, health status, health care needs, health services use, social support and health behavior. We describe below the variables used in the present analyses.

### Dependent variable

Depressive symptomatology was measured by the short version of the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977). This short version includes 11 items taken from the original CES-D scale, representing four clusters of depressive symptoms (i.e., somatic symptoms, depressed affect symptoms, lack of positive feeling symptoms, and interpersonal relation symptoms) found in the original 20 CES-D items (Kohout, Berkman, Denis, & Cornoni-Huntley, 1983). Preliminary psychometric evaluation of the 11 CES-D items from the Boston sample indicated that items which measured 'interpersonal relation symptoms' and 'lack of positive affect symptoms' had poor validity and reliability. In addition, Krause and Liang (1993) found that the CES-D items that measure somatic and depressed symptoms are more culturally appropriate for older Chinese respondents than other CES-D items. Previous studies have shown that Chinese people tend to express symptoms of depression in somatic terms (Kleinman, 1977; Krause, Liang, & Gu, 1998; Marsella, 1987) suggesting that it may be important to differentiate between the affective and somatic aspects of depression. Thus, we only used seven items to measure depression in this study (i.e., four items measuring somatic symptoms and three items measuring depressed affect symptoms). This short version of the CES-D is a good screening instrument for depressive symptoms (Krause et al., 1998; Krause & Liang, 1993). The somatic symptoms include: (1) did not feel like eating; (2) everything was an effort; (3) sleep was restless; and (4) could not get going. The depressed affect items include: (1) felt depressed; (2) felt lonely, and (3) felt sad. The alpha value for the seven items for the Shanghai sample was 0.77 and that for the Boston sample was 0.78. The value for the somatic symptoms was 0.64 for the Boston sample, 0.59 for the Shanghai sample, and 0.70 for the Boston sample and 0.72 for the Shanghai sample for depressive affect.

### Independent variables

*Health conditions that limit activities*- were measured by asking respondents, 'what are the health problems that limit your activities'. A code of 1 was assigned for each 'yes' response for the following 10 conditions: arthritis, back/neck problems, eye/vision problems, hypertension, walking problems, hearing, fracture/bone problems, lung/breathing problems, heart problems, and diabetes.

### Covariates

*Demographics*-Education was coded on a scale of 1 through 6 (1-no formal education, 2-elementary school, 3-junior high school, 4-high school, 5-technical school, and 6-other higher education such as community college, college, or graduate education). Financial adequacy was coded on a scale of 1-5, from 1-'not satisfied' to 5-'extremely satisfied'. Respondents were coded 1 if they were married, and 0 otherwise. Gender was coded 1 if female, and 0 otherwise. Age was measured in years.

*Health status*- Self-rated health status was measured by asking 'How would you rate your overall health?' (1-poor to 5-excellent). Functional impairment was defined as receiving help due to limitations of Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL). ADL help included assistance with bathing and dressing, and receiving IADL help included assistance doing household chores, preparing meals, shopping and getting to doctors' appointments. The presence of any reported help was coded as 1, and 0 otherwise. A summary score was also developed by adding one point for each of the six ADL and IADL tasks on which they received help.

*Social network*-was measured with two items. The first, 'how frequently do you see your children or other close relatives?', and the second, 'how frequently do you meet or talk with your friends?' Each question had six response categories; 0-person did not have friends or relatives; 1-contact less than once a month; 2-contact at least once every two weeks to once a month; 3-contact at least once a week; 4-contact two-four days a week; and 5-contact with friends or relatives every day.

*Health behavior*-Exercise was measured with one question 'Do you exercise on a regular basis (two-three times a week or more)?' Yes was coded as 1, and 0 otherwise. The variables Current Smoker and Regular Drinker (two-three times a week or more) were coded as 1, and 0 otherwise.

*Acculturation measures*-was measured by length of stay in the US and limitation with the English language for the Boston sample. The length of stay was measured by the number of years in the US. Limitations with the English language was coded as 1 if they endorsed language-related problems on one of the following activities: shopping, transportation, communicating with neighbors or grandchildren, traveling, going to a bank or to health care settings, watching television, or leisure activities.

## Analysis

Three dependent variables: seven-item CES-D, somatic symptoms (4 items), and depressive affect (3 items) were measured in the study. For each dependent variable, separate linear regression models were run for the Boston sample only, Shanghai sample only, and the combined sample. Independent variables and covariates were selected based on a number of guidelines. First, we included variables identified in previous research as significant contributors to depression. Of these variables, those showing a significant relation to the dependent variable in either the Boston or Shanghai sample were included in all models. However, variables with low prevalence in these samples, such as stroke, cancer, smoking, and alcohol use were excluded from the final models. Acculturation measures (i.e., number of years in the US and English limitations) applied only to the Boston sample, so they were only included for that sample. Since income was measured differently for each sample, the measure of self-rated financial satisfaction, instead of income, was included in the models. In the Boston sample, self-rated general health status was significantly correlated with somatic symptoms ($r = 0.51$) and some of the health problems such as back/neck problems ($r = 0.42$). Therefore, this variable was dropped in the final models.

# Results

## Sample characteristics

Table 1 shows the sample characteristics. The two samples were significantly different in some aspects such as scores of depressive symptoms, health status, health behaviors and social support. The Shanghai residents had a significantly higher seven-item CES-D score, as well as higher somatic and depressive affect scores compared to the Boston immigrants. Whereas, respondents in Boston had higher self-rated general health status, reported healthier behavior, and fewer of them reported health problems limited to their daily activities. For the Boston sample, further analysis was conducted by categorizing the sample into two groups, individuals who had stayed in the US for more than 10 years versus those new comers. The somatic symptoms score for new and old comers were 2.16 and 1.56 ($p$ = 0.06), respectively; for depressive affect items, the scores were 0.66 and 0.67 ($p$ = 0.94), respectively (results not shown in Table 1).

**Table 1. Comparison of model variables in Boston and Shanghai samples.**

| | Boston ($N$ = 177) | | Shanghai (N = 428) | | |
|---|---|---|---|---|---|
| **Variables** | **M/%** | **SD** | **M/%** | **SD** | **$t$-Test/$\chi_2$ Test** |

Notes: Not Applicable for the Shanghai sample. Dichotomous variables were analyzed using $\chi_2$ tests and continuous variables using $t$-tests.
***$p$ < 0.001; **$p$ < 0.01; *$p$ < 0.05.

| Variables | M/% | SD | M/% | SD | $t$-Test/$\chi_2$ Test |
|---|---|---|---|---|---|
| Depressive symptoms | | | | | |
| Total seven items | 2.44 | 3.01 | 3.35 | 3.18 | 3.25** |
| Somatic symptoms (four items) | 1.77 | 2.06 | 2.15 | 1.97 | 2.17* |
| Depressive affect (three items) | 0.67 | 1.35 | 1.19 | 1.61 | 3.82*** |
| *Sociodemographic characteristics* | | | | | |
| Age | 71.81 | 7.19 | 69.67 | 6.75 | -3.47** |
| Female | 62.15% | - | 59.34% | | 0.41 |
| Education (range: 1-6) | 3.59 | 1.46 | 3.4 | 1.48 | -1.44 |
| No any formal education | 4.52% | - | 5.65% | - | - |
| Primary school | 23.73% | - | 29.18% | - | - |
| Junior high | 21.47% | - | 22.82% | - | - |
| High school | 23.73% | - | 17.65% | - | - |
| Associate school | 11.86% | - | 11.53% | - | - |
| College/Graduate school | 14.69% | - | 13.18% | - | - |
| Financial adequacy (range: 1-5) | 3.26 | 1.02 | 3.44 | 0.89 | 2.13* |
| Not satisfied | 5.11% | - | 1.65% | - | - |
| Not very satisfied | 18.18% | - | 15.80% | - | - |
| Moderately satisfied | 30.68% | - | 25.71% | - | - |
| Satisfied | 37.50% | - | 50.71% | - | - |
| Extremely satisfied | 8.52% | - | 6.13% | - | - |
| Married | 52.54% | - | 73.60% | - | 25.28*** |
| Social support | | | | | |

| Frequency of contacting family members and relatives | 3.34 | 1.53 | 3.18 | 1.65 | -1.11 |

# Discussion

The present study supported the hypothesis that compared to their counterparts in China, immigrants had a significantly lower score on the modified CES-D and its subscales: somatic symptoms and depressive affect. Chinese immigrant elders in the sample were also physically healthier than their counterparts in Shanghai. Controlling for other important covariates, immigration status remained significant for the CES-D subscale depressive affect.

Our study provides some evidence that Chinese immigrant elders in the sample were more resilient, particularly in the domain of depressive affect, than their counterparts in Shanghai. This is also supported by the findings from other health indicators. In comparison to their counterparts in Shanghai, immigrants in the Boston sample were physically healthier and had healthier lifestyle behaviors (i.e., higher proportion of them exercised regularly and fewer were smokers and regular alcohol drinkers), despite many social and financial disadvantages such as being older, often not married, less reported financial adequacy and language barriers, which could potentially affect their mental and physical health status. These findings support the healthy selection theory, which suggests that there is a propensity for immigrants to be healthier than a representative person in the sending country. More importantly, all respondents in the sample came to this country as an adult, so their immigration status was a matter of self-selection. Some of them came here to pursue further education and/or better job opportunities. Many of them came as older adults to reunite with their family members. Regardless of the many challenges faced in the receiving countries, for older adults, factors such as family reunification, better living environment, availability of healthcare in the place of destination, and freedom of going back and forth between the receiving and home country, could impact their psychological well being in old age. This may particularly be true for those elders who reside in areas with a high concentration of residents from the same ethnic background, and with easy access to public transportation, such as in Boston.

Depressive symptoms, particularly somatic symptoms, are strongly associated with an individual's physical health status. In *post hoc* exploratory analyses, immigration status was significantly associated with depression in the seven item and the somatic symptom models, after excluding some health condition variables. These results suggest that better physical health status may explain the lower depressive symptom in the immigrant sample.

We found that somatic symptoms were endorsed at a higher rate than the depressive affect symptoms and that there was a clear distinction between depressive affect and somatic symptoms in terms of the predictive models. Our findings are consistent with other studies on Chinese immigrants (Kleinman, 1977; Kuo, 1984) and Chinese individuals living in China (Chen et al., 1999; Krause & Liang, 1993) suggesting that somatization is more common among the Chinese culture than the western culture. Our findings differ from one study (Ying, 1988) that found no distinction between depressive affect and somatization among Chinese-Americans. These differences may be largely due to the differences in sample characteristics between the two studies.

Several health problems were found to be related to depressive symptoms in both the Boston and Shanghai samples. Among the Chinese immigrants, back or neck problems were associated with a higher level of depressive symptoms overall, as well as the two subscales of depressive symptoms. In the Boston sample, arthritis was also associated with a higher level of depressive symptoms, as well as in one of the subscales: depressive affect. On the other hand, walking problems were strongly

associated with depression in their counterparts in Shanghai. We did further analysis on the relationship between reported levels of pain and these health problems. In the Shanghai sample, compared to arthritis and back/neck problems, walking problems had a higher correlation with the measures related to intensity of bodily pain and the extent to which bodily pain interfered with normal work. In the Boston sample, the correlations between pain and arthritis and back/neck problems were similarly high. Therefore, it seems that pain may be the common underlying contributor to depression in both samples. These physical problems, which are associated with substantial pain and discomfort, can be characterized as chronic stressors, resulting in reduced social and physical activity and lower self-esteem (Chou & Chi, 2003). In addition, these findings support the idea that somatic pain is a key component of depressive symptoms among the elderly Chinese (Zhang et al., 1997).

In the Shanghai sample, several health conditions (walking, lung, and heart problems) significantly related to depression could potentially affect mobility. Impaired mobility may have a particularly negative impact on those living in Shanghai because many older adults live in apartment buildings that do not have elevators. In addition, although private automobiles are becoming increasingly available in China, they are primarily owned by the younger generation. Public transportation and taxi services are virtually the only transportation options available for older adults. Therefore, mobility problems could greatly affect an individual's daily life, including social support, which is significantly related to depressive symptoms.

## Limitations

As in any cross-sectional study, interpretations of causality must be made with caution. Under optimal circumstances data would be collected on an immigrant sample prior to and after immigration. However, the inherent difficulty of designing cross-national studies and predicting future immigrants makes such studies prohibitive. Likewise, the sampling methods differed between Boston and Shanghai. Attempts to enroll Chinese elders in a research project by random sampling are not efficient in Boston.

In the Boston sample, the findings are limited by the potential inherent bias associated with self-selection. Because the sample is non-random, generalizability of our findings is limited by the characteristics of the participants. The study is further limited by the non-parallel data collection procedures. It is possible that bias was introduced by collecting the data using face-to-face interviews in Shanghai sample and using self-administered questionnaires in the Boston sample. In particular, it may be that elders in Boston with limited education failed to participate in the survey. We attempted to minimize this issue by encouraging the Boston elders who had difficulty completing the questionnaire to consult with staff at the Chinese service agency, their family members, their Chinese neighbors, and friends. We also note that the non-response rate was comparable in both samples: 88% in Boston and 91% in Shanghai. We also note that the sample in Shanghai was in part selected by educational level in order to ensure that the two samples would be comparable. In addition, other studies conducted among immigrant populations have shown that the quality of data collected using face-to-face interviews and self-administered questionnaires is the same (Lorig, Gonzalez, Ritter, & Nacif de brey, 1997; Martin, VanOss-Marin, & Perez-Stable, 1990). Specifically, data collected on health outcomes, such as CES-D, disability, and pain, have been shown to be comparable using these two methods of data collection (Lorig et al., 1997).

We are also aware that numerous unmeasured sources of heterogeneity among immigrants may have influenced our results. Shanghai is one of the major areas in China from which immigrants come to the US. However, as part of the present study, we did not collect data on geographic region of origin within China; thus, it is possible that some of the Chinese immigrants in our sample came from other regions of China. Other sources of heterogeneity are immigration status, political and socioeconomic environment of the sending countries, purpose of immigration, residing areas, availability of social

support network-all of which could also contribute to individuals' mental health status. Given that our study focused on Chinese elders, future work should examine other immigrant groups to validate these findings and explore differences among both Asian and other groups of immigrants.

From a conceptual standpoint, ideally additional variables measuring the multi-dimensional characteristics of acculturation would have been useful. Unfortunately, only information about an individual's English language skills and length of stay in the US were collected. Because the Boston sample was identified through Chinese service agencies and senior housing, they may have more interaction with other Chinese people, and access to Chinese newspapers and TV stations. It could partially explain that a language barrier was not a significant factor related to depressive symptoms.

Despite the limitations mentioned above, this study expands on previous research in several important ways. This is one of the first studies to examine depressive symptoms and its correlates in a first-generation immigrant population and to compare these findings with their counterparts in the land of origin. Older adults' depression symptoms in the Shanghai sample could be used to represent baseline levels with which to compare post-immigration depressive symptoms. Our findings provide additional support for the healthy immigration selection theory by showing that immigrants may be more resilient than their counterparts in their home country despite the many challenges they may face in receiving countries. With the growing number of older Chinese immigrants in the US, knowledge of the frequency of depressive symptoms and the factors associated with depression symptoms is essential to provide culturally competent services to better serve this population.

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